

Standard Rectifier

$$V_{RRM} = 2 \times 1200V$$

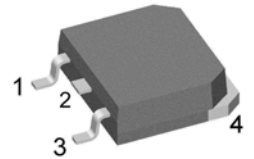
$$I_{FAV} = 25A$$

$$V_F = 1.16V$$

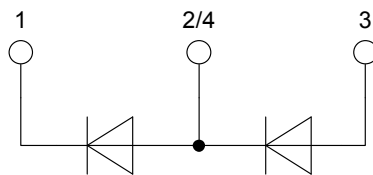
Phase leg

Part number

DSP25-12AT



Backside: anode/cathode



Features / Advantages:

- Planar passivated chips
- Very low leakage current
- Very low forward voltage drop
- Improved thermal behaviour

Applications:

- Diode for main rectification
- For single and three phase bridge configurations

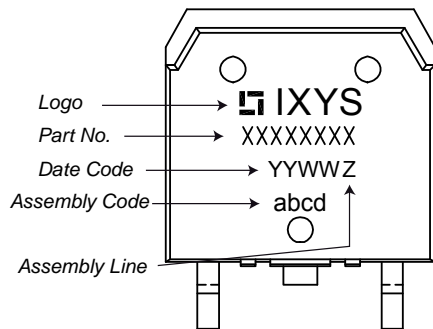
Package: TO-268AA (D3Pak)

- Industry standard outline
- RoHS compliant
- Epoxy meets UL 94V-0

Rectifier			Ratings			
Symbol	Definition	Conditions	min.	typ.	max.	Unit
V_{RSM}	max. non-repetitive reverse blocking voltage	$T_{VJ} = 25^{\circ}C$			1300	V
V_{RRM}	max. repetitive reverse blocking voltage	$T_{VJ} = 25^{\circ}C$			1200	V
I_R	reverse current, drain current	$V_R = 1200 V$	$T_{VJ} = 25^{\circ}C$		40	μA
		$V_R = 1200 V$	$T_{VJ} = 150^{\circ}C$		1.5	mA
V_F	forward voltage drop	$I_F = 25 A$	$T_{VJ} = 25^{\circ}C$		1.23	V
		$I_F = 50 A$			1.47	V
		$I_F = 25 A$	$T_{VJ} = 150^{\circ}C$		1.16	V
		$I_F = 50 A$			1.50	V
I_{FAV}	average forward current	$T_C = 135^{\circ}C$ 180° sine	$T_{VJ} = 175^{\circ}C$		25	A
V_{FO}	threshold voltage	} for power loss calculation only	$T_{VJ} = 175^{\circ}C$		0.81	V
r_F	slope resistance				13.8	m Ω
R_{thJC}	thermal resistance junction to case				0.9	K/W
R_{thCH}	thermal resistance case to heatsink			0.15		K/W
P_{tot}	total power dissipation		$T_C = 25^{\circ}C$		160	W
I_{FSM}	max. forward surge current	$t = 10 \text{ ms; (50 Hz), sine}$	$T_{VJ} = 45^{\circ}C$		300	A
		$t = 8,3 \text{ ms; (60 Hz), sine}$	$V_R = 0 V$		325	A
		$t = 10 \text{ ms; (50 Hz), sine}$	$T_{VJ} = 150^{\circ}C$		255	A
		$t = 8,3 \text{ ms; (60 Hz), sine}$	$V_R = 0 V$		275	A
I^2t	value for fusing	$t = 10 \text{ ms; (50 Hz), sine}$	$T_{VJ} = 45^{\circ}C$		450	A ² s
		$t = 8,3 \text{ ms; (60 Hz), sine}$	$V_R = 0 V$		440	A ² s
		$t = 10 \text{ ms; (50 Hz), sine}$	$T_{VJ} = 150^{\circ}C$		325	A ² s
		$t = 8,3 \text{ ms; (60 Hz), sine}$	$V_R = 0 V$		315	A ² s
C_J	junction capacitance	$V_R = 400 V; f = 1 \text{ MHz}$	$T_{VJ} = 25^{\circ}C$		10	pF

Package TO-268AA (D3Pak)			Ratings			
Symbol	Definition	Conditions	min.	typ.	max.	Unit
I_{RMS}	RMS current	per terminal			70	A
T_{stg}	storage temperature		-55		150	°C
T_{vj}	virtual junction temperature		-40		175	°C
Weight				5		g
F_C	mounting force with clip		20		120	N

Product Marking



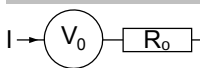
Ordering	Part Number	Marking on Product	Delivery Mode	Quantity	Code No.
Standard	DSP25-12AT	DSP25-12AT	Tube	30	403089

Similar Part	Package	Voltage class
DSP25-12A	TO-247AD (3)	1200
DSP25-16AT	TO-268AA (D3Pak) (2)	1600
DSP25-16A	TO-247AD (3)	1600
DSP25-16AR	ISOPLUS247 (3)	1600

Equivalent Circuits for Simulation

* on die level

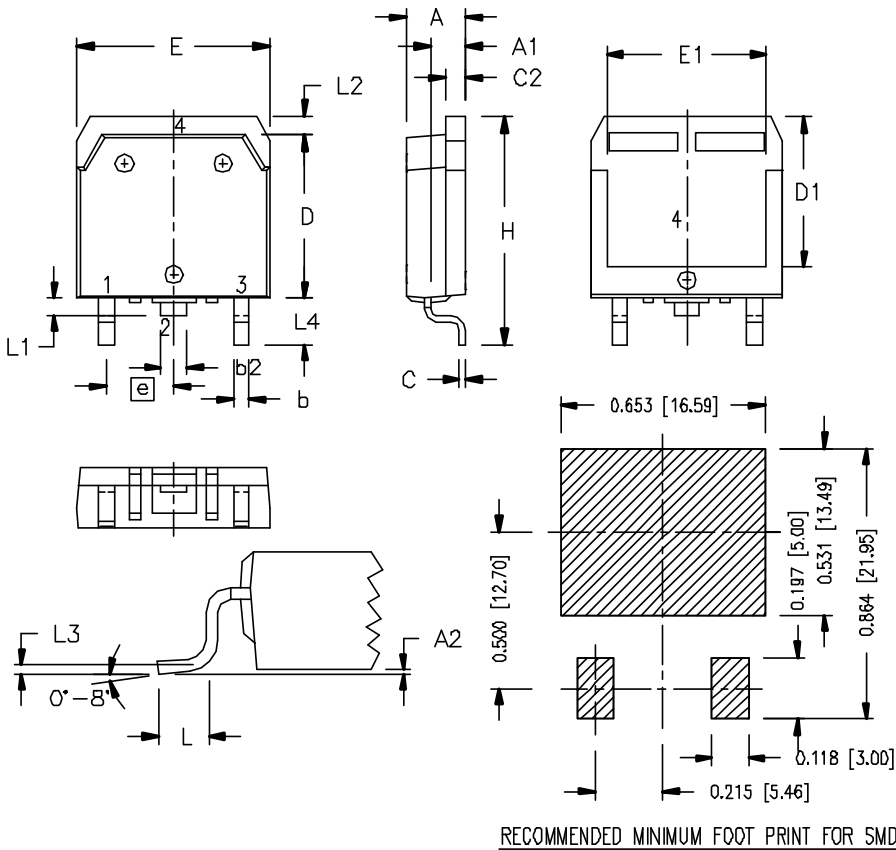
$T_{vj} = 175^{\circ}C$



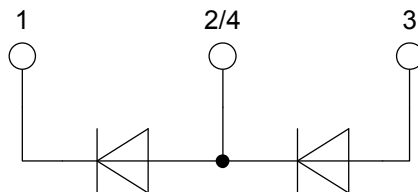
Rectifier

$V_{0\ max}$	threshold voltage	0.81	V
$R_{0\ max}$	slope resistance *	11.2	mΩ

Outlines TO-268AA (D3Pak)



Dim.	Millimeter		Inches	
	min	max	min	max
A	4.90	5.10	0.193	0.201
A1	2.70	2.90	0.106	0.114
A2	0.02	0.25	0.001	0.100
b	1.15	1.45	0.045	0.057
b2	1.90	2.10	0.075	0.083
C	0.40	0.65	0.016	0.026
C2	1.45	1.60	0.057	0.063
D	13.80	14.00	0.543	0.551
D1	12.40	12.70	0.488	0.500
E	15.85	16.05	0.624	0.632
E1	13.30	13.60	0.524	0.535
e	5.45 BSC		0.215 BSC	
H	18.70	19.10	0.736	0.752
L	2.40	2.70	0.094	0.106
L1	1.20	1.40	0.047	0.055
L2	1.00	1.15	0.039	0.045
L3	0.25 BSC		0.100 BSC	
L4	3.80	4.10	0.150	0.161



Rectifier

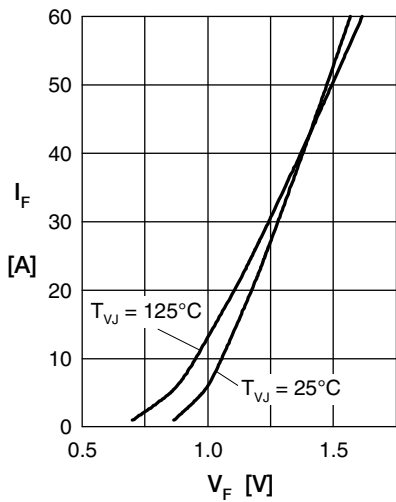


Fig. 1 Forward current versus voltage drop per diode

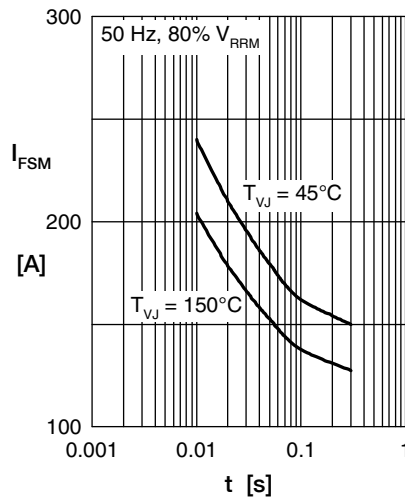


Fig. 2 Surge overload current

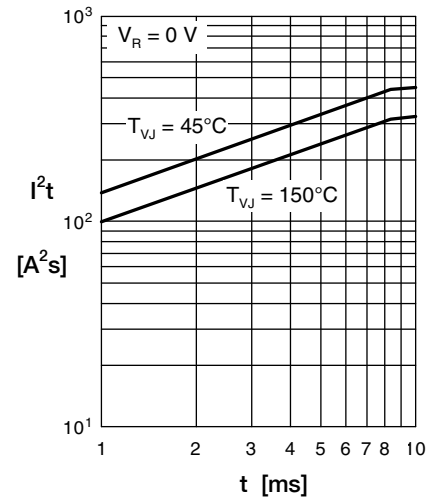


Fig. 3 I^2t versus time per diode

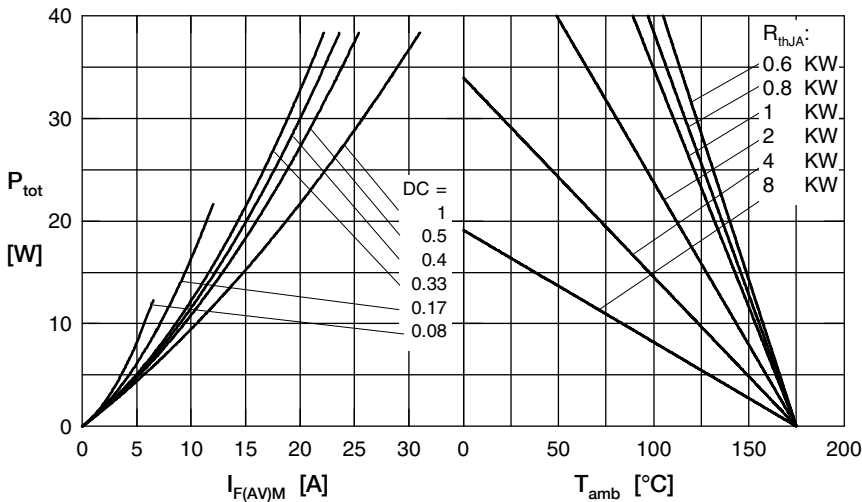


Fig. 4 Power dissipation vs. direct output current and ambient temperature

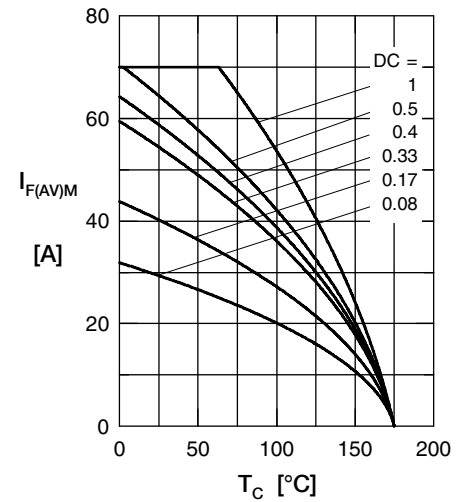


Fig. 5 Max. forward current vs. case temperature

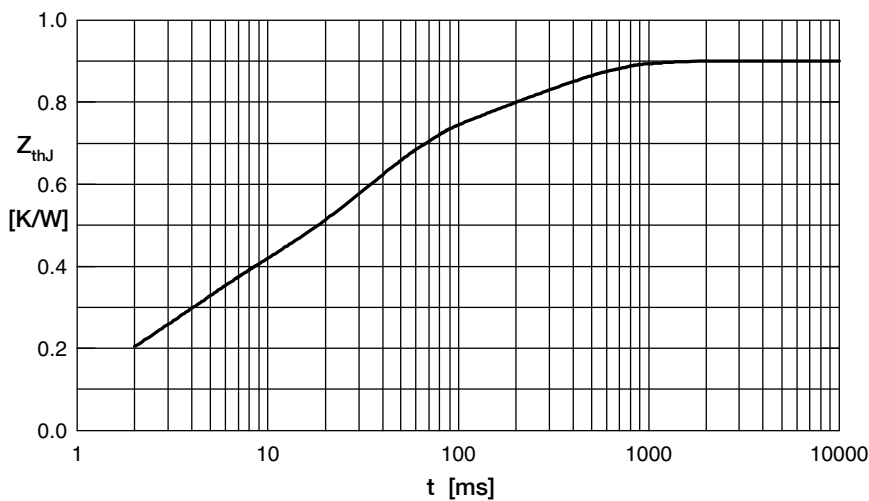


Fig. 6 Transient thermal impedance junction to case

Constants for Z_{thJC} calculation:

i	R_{thi} (K/W)	t_i (s)
1	0.03	0.0004
2	0.08	0.002
3	0.2	0.003
4	0.39	0.03
5	0.2	0.29

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